FEDERAL COMMUNICATIONS COMMISSION
INTERNATIONAL BUREAU

Satellite and Radiocommunication Division
Satellite Policy Branch

To: Mr. William F. Caton, Acting Secretary

Date: February 20, 1996

From: Jennifer M. Gilsenan

Re: Ex Parte presentation
CC Docket No. 92-297

This will serve to indicate that on February 16, 1996 representatives of the International Bureau and the Wireless Telecommunications Bureau met with participants listed in Attachment A to this memorandum to discuss the Commission's proposals in the above-referenced proceeding.

The attached documents formed a basis for discussion.

Attachment A

2/16/96 28-GHz Status Conference

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28 GHz Band Plan Options

Option 1: Band plan proposed in the Third NPRM.

LMDS fss	GSO/FSS ngso/fss	NGSO/FSS gso/fss	MSS FEEDER LINKS & LMDS [H→S]	MSS FEEDER LINKS & GSO/FSS	GSO/FSS ngso/fss
850 MHz	250 MHz	500 MHz	150 MHz	250 MHz	500 MHz

27.5 28.35 28.6 29.1 29.25 29.5 30.0 GHz

- LMDS subscriber transceivers would not be able to transmit in the band shared with feeder links.
- TRW would operate on a reverse band basis. Sharing criteria necessary between feeder links for the 2 MSS systems at 19 GHz.
- First come first served protection in the 29.25-29.5 band segment.

Option 2: More Extensive Sharing Requirements

LMDS fss 850 MHz	GSO/FSS ngso/fss 250 MHz	W R C - 9 7	NGSO/FSS gso/fss 400 MHz	TRW, Motorola, & LMDS [S↔H] 150 MHz	TRW, Motorola & GSO/FSS 250 MHz	GSO/FSS ngso/fss 500 MHz

27.5 28.35 28.6 28.7 29.1 29.25 29.5 30.0 GHz

- Rules for sharing between Motorola and LMDS so that LMDS can transmit from subscriber to hubs in the shared portion of the bands. (See Attached).
- Rules for sharing between TRW and Motorola i.e., geographical separation of gateway earth stations at distances to be determined by the FCC between approximately 200 and 800 kilometers.
- Rules for sharing between 2 MSS feeder link systems and GSO systems.

Option 2A: (Submitted by Hughes)

LMDS fss	GSO/FSS ngso/fss	WRC-97	NGSO/FSS gso/fss	TRW, Motorola, & LMDS (S-H)	MSS FL (TRW) & GSO/FSS	GSO/FSS ngso/fss
850 MHz	250 MHz		400 MHz	150 MHz	250 MHz	500 MHz

27.5 28.35 28.6 28.7 29.1 29.25 29.5 30.0 GHz

- Motorola and LMDS share 150 MHz (same as Option 2).
- TRW and GSOs share 150 MHz without Motorola in the band.
- TRW shares 150 MHz with Motorola

Option 2B: (submitted by Hughes)

LMDS fss	GSO/FSS ngso/fss	WRC97_LMDS	NGSO/FSS gso/fss	TRW, Motorola,	TRW & GSO/FSS	GSO/FSS ngso/fss
850 MHz	250 MHz		400 MHz	150 MHz	250 MHz	500 MHz

27.5 28.35 28.6 28.7 29.1 29.25 29.5 30.0 GHz

- LMDS return links moved to 28.6-28.7 GHz.
- LMDS sharing with Motorola avoided.
- Teledesic bandwidth constrained to 400 MHz - WRC 95 conditional allocation
- LMDS has 25 MHz less bandwidth than option 3 - but clear.
- All others stay the same - reduces sharing requirements on Iridium and Odyssey.

Option 3(a): Staff Band Segmentation Adjustment

LMDS fss	GSO/FSS ngso/fss	WRC-97	NGSO/FSS gso/fss	Motorola & TRW	TRW & LMDS [S↔H]	TRW & GSO	GSO/FSS ngso/fss
850 MHz	250 MHz		400 MHz	150 MHz	125 MHz	25	600 MHz

27.5 28.35 28.6 28.7 29.1 29.25 29.375/29.4 30.0

- 40 kilometer coordination zone around 2 U.S. TRW sites. In this zone, LMDS accepts interference or undertakes mitigation efforts consistent with TI's proposal for subscriber to hub operations.
- Sharing criteria for Motorola and TRW (Same as Option 2).

OPTION 4

UPLINK BAND (27.5 - 30.0 GHz)

LMDS (h-to-s) (s-to-h) fss	GSO/FSS ngso/fss	WRC-97	NGSO/FSS gso/fss	MSS F.L. TRW Motorola	MSS F.L. TRW Motorola ? LMDS (h-to-s) (s-to-h)	MSS F.L. TRW LMDS (h-to-s) (s-to-h)	MSS F.L. TRW GSO/FSS	MSS F.L. GSO/FSS	GSO/FSS
850 MHz	250 MHz	100 MHz	400 MHz	100 MHz	100 MHz	25 MHz	75 MHz	100 MHz	500 MHz

27.5 28.35 28.60 28.70 29.10 29.20 29.30 29.325 29.40 29.50 30.00

At 29.2 - 29.325 GHz LMDS and MSS feeder link sharing using TI's proposed rules.

Motorola and TRW sharing rules same as Options 2 and 3.

TRW and GSO/FSS sharing rules same as Options 2 - 4.

DOWNLINK BAND (17.7 - 20.2 GHz)

GSO/FSS ngso/fss	WRC-97	NGSO/FSS gso/fss	MSS F.L. gso/fss	GSO/FSS
1100 MHz	100 MHz	400 MHz	400 MHz	500 MHz

17.7 18.80 18.90 19.30 19.70 20.20

Notes:

17.7 - 17.8 GHz band is allocated to BSS feeder links in the Earth-to-space direction.

17.7 - 19.2 GHz band is allocated to FS on a co-primary basis with satellite services.

18.6 - 18.8 GHz band is allocated to EES - FSS pfd limit @ earth's surface of -101 dBW/m**2 in a 200 MHz band for all angles of arrival.

In the 19.7 - 20.2 GHz and 29.5 - 30.0 GHz bands FSS is co-primary with MSS.

DRAFT

OPTION 4 SHARING PRINCIPLES

1. **29.1 - 29.2 GHz Band - Sharing principles between TRW and Motorola Feeder Links**

a. The two systems will use circular polarization in accordance with coordination agreement. Iridium will operate using right-hand circular polarization and Odyssey will operate using left-hand circular polarization.

b. Both systems will use power control for precipitation and range.

c. Earth station complexes of the two systems will be coordinated when they are separated by less than 800 kilometers.

d. Odyssey system will have a maximum of two feeder link earth stations in the USA and Iridium will have a maximum of six feeder link earth stations in the USA.

1) In the western USA, Iridium will have a feeder link earth station in the immediate vicinity of Phoenix, AZ and Odyssey will have a feeder link earth station in the immediate vicinity of San Luis Obispo, CA.

2) In the eastern USA, Iridium will have a feeder link earth station in the immediate vicinity of Montpelier, VT. The location of an additional Iridium feeder link earth station in the eastern USA shall not be specified until after an Odyssey feeder link earth station site in the eastern USA.

e. Earth station sites for both systems must be chosen [TBD] weeks before the commencement of the LMDS auctions.

2. **29.2 - 29.3 GHz Band - Sharing between TRW and Motorola Feeder Links, Sharing between TRW and Motorola Feeder Links and LMDS in both hub-to-subscriber and subscriber-to-hub directions.**

a. Principles for sharing between TRW and Motorola feeder links will be the same as specified in 1 above.

b. Rules for sharing between MSS feeder links and LMDS in the hub-to-subscriber direction will be those proposed in the Third NPRM, with minor modifications.

c. Rules for sharing between MSS feeder links and LMDS in the subscriber-to-hub

direction will include the following:

LMDS subscriber transceivers:

1) shall not transmit an effective isotropically radiated power (EIRP) in excess of 20 dBW/MHz in clear air and shall reduce EIRP, as a minimum, for distances of less than the maximum LMDS cell radius from the hub in accordance with the following formula:

$P(EIRP,dBW/MHz) = 20\ dBW/MHz + 20 \log(d/D)$

where d = transceiver distance to the hub
D = maximum LMDS cell radius to the hub

2) shall not transmit an effective isotropically radiated power in excess of 14 dBW/MHz in clear air if power control in accordance with the formula in 1) above is not used.

3) shall have an antenna pattern with an EIRP on antenna boresight as specified in 1) or 2) above which shall be reduced for angles from boresight in accordance with the following:

Degrees from	Relative Gain/EIRP in dB	
Boresight	Azimuth	Elevation
0	0.00	0.00
1	0.00	0.00
2	-3.25	-3.25
3	-6.25	-6.25
4	-9.50	-9.50
5	-12.75	-12.75
6	-16.00	-16.00
14	-16.00	-16.00
15 to 90	-30.00	-30.00

d. Operation of terrestrial station in the LMDS service within [TBD] km of a non-GSO feeder link earth station are unprotected and could be subject to harmful interference from the licensed earth station.

e. In each LMDS cell at any particular time, transmissions shall be either hub-to-subscriber or subsriber-to-hub direction, but not both.

3. **29.3 - 29.325 GHz Band - Sharing between TRW and LMDS in both hub-to-subscriber and subscriber-to-hub directions.**

a. Sharing between TRW and LMDS in both hub-to-subscriber and subscriber-to-hub directions will be the same as specified in 2 above.

4. **29.325 - 29.4 GHz Band - Sharing principles between TRW and GSO/FSS providers.**

a. The party causing unacceptable interference has primary responsibility to mitigate the interference, but neither system shall be required to disrupt or alter its transmissions.

b. Odyssey will have 2 earth stations in the U.S. one on the east coast and the other on the west coast, operating with left-hand circular polarization as specified in 1 above. GSO/FSS operators will implement beam frequency selection and/or opposite sense of polarization in the vicinity of Odyssey earth station complexes in order to minimize instances of unacceptable interference in a manner that is consistent with their GSO beam footprint.

c. Only NGSO/MSS systems will use the 19.3 - 19.7 GHz band as a companion downlink band to 29.1 - 29.5 GHz on a primary basis.

5. **29.4 - 29.5 GHz Band - Sharing between MSS Feeder Links and GSO/FSS providers.**

a. Use of the band for MSS feeder links will be subject to further sharing and coordination agreements that are acceptable to the affected GSO/FSS parties.

6. **17.7 - 18.8 GHz Band - GSO/FSS Downlink Band Primary**

a. Coordination between FSS and primary fixed service users will be done under existing FSS and fixed service coordination principles, i.e. §§ 21.100(d), 25. 130(b).

OPTION 5

UPLINK BAND (27.5 - 30.0 GHz)

LMDS (h-to-s) (s-to-h) fss 700 MHz	GSO/FSS ngso/fss 250 MHz	LMDS (h-to-s) (s-to-h) fss 150 MHz	WRC-97 100 MHz	NGSO/FSS gso/fss 400 MHz	MSS F.L. LMDS (h-to-s) 150 MHz	MSS F.L. GSO/FSS 250 MHz	GSO/FSS 500 MHz

27.5 28.20 28.45 28.60 28.70 29.10 29.25 29.50 30.00

Sharing between MSS feeder links and LMDS at 29.1 - 29.25 GHz using 3rd NPRM proposed rules.
TRW/GSO FSS sharing rules same as options 2 - 4.